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persons, has been built on the east, south and west sides of the upper gallery of the large dome. As we sometimes have as many as two hundred and fifty visitors to the Observatory during one of our public nights, this addition has become necessary.

The Gundlach Optical Co., of Rochester, N. Y., is making a low-power eye-piece with a large field—something like half a degree—for the use of visitors who come to see the Moon. Such an eye-piece will show enough of the lunar surface to make a *picture* with a background of sky, which is what is really needed to convey the effect. The eye-pieces used in the regular astronomical observations have fields of view of hardly more than 10′ of arc, and, hence, only serve to show a limited portion of the Moon's surface—less than one-tenth, usually. As the image of the Moon in the large telescope is 6.51 inches in diameter, it follows that the field lens of the new eye-piece must be of about the same dimensions. It will be useful in real work also, for objects like nebulæ and comets, where a large field and full contrast are required. E. S. H.

AMERICAN EQUATORIAL MOUNTINGS ON SALE IN BERLIN.

The Observatory has lately received the price-list of TH. WEGENER of Berlin. So far as I have examined it, the instruments appear to be well-designed. It is not for this reason that it is mentioned, but because, on page 6, there is given a full-page wood-cut of the equatorial telescope and mounting of the Observatory of Beloit College, Wisconsin. This admirable mounting was made by WARNER & SWASEY, of Cleveland, from their own designs, and it is an excellent model to follow. It would have been more straightforward for Herr WEGENER to have made some acknowledgment of the source from which he derived his model. His wood-cut has no title, and conveys the impression that the design was made by him. Messrs. WARNER & SWASEY have, however, no cause to complain. Imitation is the sincerest flattery. I can heartily recommend the design of the mounting which Herr WEGENER proposes to make. E. S. H.

NOTES ON DOUBLE STARS.

The HERSCHEL companion to ψ^1 *Aquarii* is shown in the 36-inch telescope to be a very close double star. From a single measure the distance appears to be less than $0''.15$, and, of course, it is a different object, even in a large refractor. This companion has the same proper motion as the large star, and the relative change is practically nothing since the measures of STRUVE, in 1836, when the distance was 49″.63 in the position-angle of 312°.2.

Prof. HOUGH found the neighboring star ψ^3 (95) *Aquarii* double, with the Chicago 18½-inch refractor, in 1884, the companion being eleventh magnitude, at a distance of a little more than 1″. Last year this was noted independently here with the 12-inch, and measured on three nights, the result being substantially the same as the single measure by HOUGH in 1884. In the course of the observations given above, this star was looked at with the 36-inch on two or three nights, but there was not the faintest trace of the companion. I am wholly unable to account for this failure, as there was apparently no change in the preceding four years. It should be carefully watched hereafter.

The sixth magnitude star, 44 *Cassiopeiæ*, has a minute attendant, hitherto unseen, at a distance of 1″.7 from the principal star.

Several new pairs have been found in the *Pleiades*, one of them following *Alcyone* 64^s and about 4′ north. This is a difficult pair, as the distance is only 0″.3, and the components below the ninth magnitude. Another new pair, still more difficult, is 55^s following *Pleione* (28 *Tauri*). The distance of this pair is about 0″.4, but the components are only 11½ magnitude.

Since the time of HERSCHEL, 67 *Ophiuchi* has been known as a wide double star (54″). The large telescope shows a very faint star at a distance of 6″.8.

The star D. M. 63°, 1618, has a very small companion at a distance of 4″.3. The principal star is brighter than sixth magnitude, but is strangely wanting in nearly all of the star catalogues covering this part of the heavens. It is not in the B. A. C., Radcliffe (1 and 2), Lalande, Argelander U. N., Heis, Piazzi, Bradley, Romberg, AOe, Grant, D'Agelet, Armagh, Yarnall, Bonn observations. In fact, it is found only in the D. M. and Rumker (No. 8289), the magnitudes being 5.9 and 5.6, respectively. In the Harvard Photometry the magnitude is 5.82. In observing it here as a double star the magnitude was estimated 5.8. It does not appear to be variable, and is probably a rare example of star catalogue omissions. The attention of meridian observers is called to this object.*

The double star, Σ2816, consists of a sixth magnitude primary, and two 7½ m. companions with distances from the larger star of about 12″ and 20″, respectively. These stars have remained relatively fixed since 1832. The large telescope shows a minute companion within 1″.5 of the large star.

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*This star will be observed by Professor SCHAEBERLE with the L. O. meridian circle.—E. S. H.

The fifth magnitude star, 2 *Andromedæ*, is a very close and difficult pair, the distance being only 0″.8, and the components quite unequal. This was suspected with the 12-inch, and verified and measured with the 36-inch.

HERSCHEL noted a ninth magnitude companion to *α Cassiopeiæ* at a distance of 63″. The large telescope shows a very faint star at a distance of 17″.5.

The distance of the close pair in *γ Andromedæ* (*OΣ* 38) is now less than 0″.1. It is very difficult, and the best conditions are necessary to see the elongation at all with the large telescope.

The binary star, 7 *Tauri*, has been rapidly changing. The distance now is 0″.30.

The large refractor fails to show any third star in the system of 70 *Ophiuchi*, and both components are single with all powers. At one time 72 *Ophiuchi* was thought to be double (*OΣ* 342), but no companion can be seen here. S. W. B.

NOTES ON STELLAR SPECTRA.

The spectra of the following stars (among many others) have been examined here during the past summer with a small spectroscope attached to the 36-inch equatorial, and in response to inquiries which have been made, I give below a preliminary statement of the results. The spectroscope which was used has no measuring apparatus, and the positions of lines are merely eye estimates.

γ Cassiopeiæ. This star is the most conspicuous example of VOGEL'S class I *c*, and remarkable changes in the bright lines in its spectrum have been observed by VON KONKOLY, VON GOTHARD and others. I have therefore examined it frequently, but, so far, no changes have been seen. The C and F lines are brilliant, narrow and sharp; Hγ, in the violet, is seen with some difficulty. The green is full of very fine, delicate dark lines, seen only under good atmospheric conditions, the *b* group being somewhat more prominent than the others. There is also an appearance of faint bright lines in the green, which may be due to the actual existence of bright lines, or, perhaps, to spaces between the fine dark lines just mentioned, seeming bright by contrast. It is difficult to decide on this point. There are in all eight or ten such places. Somewhat nearer to C than to the estimated position of D is a fairly prominent dark band,